20 September 1974

STATINTL

MEMORANDUM FOR: Director of Joint Computer Support

SUBJECT   :   ████ Technical Audit

I.   INTRODUCTION

    As requested, ████████████████ and myself conducted a review   STATINTL
of the status of the ORACLE project at the Contractor's site in
████████ during the period of 9 through 13 September. Our charter
was to determine the current status of the hardware and software
development undertaken by ████ We did not concern ourselves with
evaluating or critiquing either the quality or the quantity of the
work performed, only to determine what has been accomplished to date.

    We feel the purpose of this determination of status was fully
satisfied. We now have a reasonably accurate picture of where the
project stands at this point in time.

    The cooperation we received from the ████ personnel was to our   STATINTL
complete satisfaction. Their response to our request for information
or clarification was prompt and concise. We have no reason to suspect
the accuracy of anything that was seen or heard during our week of
briefings, discussions or demonstrations.

    The report will deal with the status of the hardware, ████ and   STATINTL
Agency developed software and user publications.

    There is a summary on page 16

II. HARDWARE

    The hardware portion of the audit was conducted by both viewing
the individual components, observing their functional interaction as
used by the existing TMS2 (Terabit Memory System - Agency version)
software and by status briefings from ████ personnel.   STATINTL

    A.   Existing Inventory

         The following pieces of equipment were observed and will be

2)   External Data Channel Processor (EDCP)

(2) - PDP 11/45 CPU's
Each PDP 11/45 (EDCP) consists of:

° 64K bytes of core memory

° 16K bytes of MOS memory plus required
  MOS memory controllers

° Real time programmable clock

° Memory management unit

° Bootstrap loader

° Required mounting box and cabinet

(2) - TBM Channel Interface Units (TCIF)
This is the interface between an EDCP and
a Data Channel (DC). There is one TCIF
for each EDCP.

(4) - Channel Simulators (CHSIM)
This is the interface between an SCP or
an EDCP and a 3330 like disk controller.
There is one for each SCP and EDCP.

(5) - Unibus Links
These are used to link the two SCP's to
each EDCP and to each other.

b.   Data Storage Section (DSS)

(2) - Transport Drivers (TD)

(2) - Dual Transport Modules (DTM)
Two drives/modules

(2) - Data Channels (DC)

(2) - TTY Units
These will be plugged to an EDCP, TD or DC on
demand to perform diagnostic work or for use
as an input device for stand-alone testing.

(1) - Blower Module
Used for vacumn and cooling.

soon as the second controller is converted
to dual port, the two single port spindles
will be returned to CDC. These controllers
and spindles will not be shipped with the
system. Replacements will be provided by
CDC.

3. Outstanding Requirements

The Tape Dubbing Buffer represents the most signifi-
cant deficiency in the hardware schedule. This is the feature which
will allow TBMTAPE-to-TBMTAPE transfers without the need for SCP or
EDCP intervention. This feature will probably not be ready by the
planned January shipping date. The lack of this buffer could delay
the shipping schedule by a month or two.

C. Second Increment

This refers to the Agency's option to increase the DSS
portion of the system by adding two additional TD's and four additional
DTM's. All required parts have been received or are scheduled to be
received by November. Second increment is scheduled for delivery
during July 1975 if we so desire.

D. Manuals

There are four categories of hardware manuals which will be
delivered with the system.

1. Maintenance and Repair of the DSS system. These
manuals were developed and produced for the TMS1 ████████ system   **STATINTL**
and will be used with minor modifications.

2. Theory of Operation

Again, existing TMS1 manuals will be used. Additional
manuals to describe the SCP and EDCP operation have not been started.
No completion dates have been established.

3. Engineering Drawings

In addition to the existing TMS1 manuals, additional
manuals for the TCIF and TDIF are now being prepared and will be
available by 1 January 75.

4. OEM Manuals

Manuals supplied with the PDP and NOVA minicomputers

° Program paging

° Core management services

° Inter-CPU & terminal communications

° Executive services common to most operating systems, e.g., TIME, WAIT, POST, etc.

2. The basic SCPOS is running successfully. It is developed to the point where user or application programs are capable of using it to perform required system level functions. For example, the batch processing functions (JOBEXEC) has successfully used most of the SCPOS functions. Our estimate is that SCPOS is 80% complete if a minimum recovery/reconfiguration capability is acceptable in Release 1 of TMS2.

3. The remaining major functions which have not been fully implemented are:

° A system start up capability which allows the operator to specify optional run-time parameters. These parameters are now assembled into a system table and are not externally accessable.

° The ability for one SCP to communicate with the other.

° Recovery, reconfiguration and error processing.

° Memory mapping to address more than 32K of core.

° 3330 I/O handler.

STATINTL

4. The ▮▮▮▮ estimate to complete SCPOS is 3 man-months. We think this is a minimum figure especially since the extent of the recovery and reconfiguration capability required in Release 1 has yet to be established. Until the scope of recovery and reconfiguration is settled and we have a hard set of specifications, estimates to complete SCPOS are tenuous at best.

B. Data Management System (DMS)

1. Acting in conjunction with the 3330 handler function of SCPOS, DMS allows an application program to build, update and access 'files' of data required by various functions with the MSS.

° Host initialization message handling

° Error handling and recovery procedures

° Host and job contention for data sets

° Security and accounting

STATINTL   4. ▇▇▇▇estimates they will require 4 man-months to complete JOBEXEC. This seems reasonable if only a minimum recovery and error handling capability is included in Release 1.

D. VMEXEC

1. VMEXEC is that function within the SCP which schedules the migration of minidisks based on communications with host CPU's operating under VM/370.

2. Detailed design flow charts exist, however, no coding has been initiated. The development of VMEXEC has been dormant for several months.

3. Existing detail design was to support CP/CMS. Some changes may be necessitated by VM/CMS.

4. The implementation of VMEXEC should not be all that difficult. The experience gained from developing JOBEXEC and using SCPOS and DMS services should enable a rather straightforward task. We believe 5 man-months would be adequate.

E. Data Transfer Control

1. Data Transfer Control is that function, normally resident in the second SCP, which utilizes the EDCP's and the DSS to initiate and monitor the migration of data sets or minidisks between the TBMTAPE's and BSS disks.

2. A very basic Data Transfer Control capability is now running in the single SCP system. Demonstrations of data set transfers via simulated host messages to the SCP indicates the facility does exist. However, much additional work is required.

3. Areas which require attention:

° Multitasking is not available

° There is no recovery from data or system errors

° Activity logging must be implemented

    °   MOUNT/DISMOUNT

    °   DISPERSE from LOGTAPE to PRODTAPE

    °   INITIALIZE minidisk

    °   INITIALIZE TBMTAPE

    °   TBMTAPE COMPRESSION
        etc.

2.   None of these capabilities have advanced beyond the idea or functional specifications level. In most cases, it still has not been decided exactly how these functions will operate.

3.   Coding for these functions is nonexistant. Some functions cannot be efficiently implemented until the hardware tape dubbing feature has been completed.

4.   Coding for any of these functions should not be significant. The effort will be in establishing which of the functions are required in Release 1 and exactly how, when and by whom they will be used.

H.   Operator Communications

1.   This refers to the MSS operators' ability to communicate with the system to initiate utilities, control system resources or determine system status.

2.   Some dozen different commands have been functionally designed, however, detail design is scarce and programming has not begun. There are existing 'scaffolding' types of supporting utilities but they are only designed for program test and development and are not designed for production duties.

3.   As in File Management, deciding what and how to implement for Release 1 has to be resolved.

4.   Estimates for implementation cannot be determined until the scope of the effort has been solidified in Release 1 document.

I.   Management Information (MIS) and System Performance Monitoring

1.   This is the general capability of the system to provide to the MSS operator, or to the host CPU via an ascended data set, information regarding internal activities, efficiencies and status of the system.

3. Detail design is incomplete and the existing code is minimal in this area.

4. Until the exact recovery and reconfiguration requirements of Release 1 are established, there is no way to determine the implementation level of effort. A full blown recovery system with alternate path correction techniques to bypass faulty devices, data sets and CPU's could require several man-years of effort.

L. Miscellaneous Development

1. Extensive modifications have been made to the DEC supplied software. These changes have been documented and incorporated into the system.

2. Several debugging type utilities have been developed and will be supplied with the system.

IV. AGENCY SUPPLIED SOFTWARE

The audit of this software was conducted by reviewing the status of each new or modified routine and by examining the existing documentation and listings for the routines.

Each affected routine in the OS/MVT area will be briefly described and a statement as to its status will be provided.

Implementation documentation does exist in the ASP and VM areas but no coding has begun.

A. OS/MVT

1. SVC Interface

An SVC is used by the application modules such as ASP to send messages to MSS. This effort is complete and there are no planned enhancements.

2. MSS Service Task

This is a system task used to communicate with MSS and to process commands from MSS. All basic functions are complete. Areas requiring additional work are:

° Disk queuing of messages

° ASP interface

° GDG's

These modifications send messages to MSS describing the use of a data set by a job for two reasons:

° Performance - unmodified old data sets need not be descended.

° Recovery - allows MSS to checkpoint the status of a data set.

Coding will begin in about a week.

We estimate that within the OS/MVT area about 50% of the required modifications to existing routines and about 90% of the new routines have been completed.

V.   USER MANUALS

STATINTL   ▮▮▮▮ plans to supply three user oriented manuals with the system.   Tentative outlines for all three have been established but have not been approved.   The current ▮▮▮▮ schedules for user   STATINTL
publications are as follows:

A.   OPERATOR'S GUIDE   (Estimated 100 Pages)

		Date Begun	Date Completed
1.	Outline	9/27/74	10/4/74
2.	First Draft	10/11/74	10/25/74
3.	Final Draft	11/8/74	11/15/74
4.	Customer Ship	5/9/75	

B.   OPERATING SYSTEM USER'S GUIDE   (Estimated 200 Pages)

		Date Begun	Date Completed
1.	Outline	12/13/74	12/20/74
2.	First Draft	12/27/74	1/24/75
3.	Final Draft	1/31/75	2/21/75
4.	Customer Ship	5/9/75	

The amount of effort required to 'complete' the project will
depend, to a large extent, on the minimum sophistication which is
acceptable to the Agency in the initial version.   This will be
specified in the forthcoming TMS2 Release 1 document.

STATINTL

-17-

STATINTL

TRANSMITTAL SLIP	DATE 23 Sept.
TO: ▮▮▮▮▮▮▮▮▮▮	
ROOM NO.	BUILDING

REMARKS:

I have not as yet
disseminated any copies of
this report except to you and
Mr Fitzwater My suggested
list would be:

▮▮▮▮▮▮▮

Contracting officer
documentation?

STATINTL

If you'll advise I'll take care of the
distribution.

STATINTL

FROM: ▮▮▮▮▮▮▮▮
ROOM NO. ▮▮▮▮▮	EXTENSION

FORM NO. 241
1 FEB 55   REPLACES FORM 36-8
WHICH MAY BE USED.   (47)